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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,303	01/28/2004	Gregg W. Landry	ISR-018-US	9362

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EXAMINER	
IP, SHIK LUEN PAUL	

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 12/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/766,303	LANDRY ET AL.	
	Examiner	Art Unit	
	Paul Ip	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-5,9-12,17-31,34-36,40-43 and 48-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-5,9-12,17-31,34-36,40-43 and 48-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 3, 4, 9-11, 34, 35, 40-42, 57, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al (5,613,261) in view of Bohman (4,918,441).

With respect to claims 3, 9, and 34, the patent to Kawakami et al discloses an autonomous cleaning apparatus as shown in figure 2 comprising a drive system (see figures 1 and 3), a controller 20, and a debris sensor 37 connected to a mode setting unit 34 for controlling a driving controller 32 and a cleaner controller 33 at different cleaning modes. Whereas, the claims recite that the processor is responsive to the debris signal to (1) select a pattern of movement of the cleaning apparatus and (2) steer the cleaning apparatus toward an area

containing debris. Kawakami et al do not specifically recite debris/dust sensors for controlling the direction of movement of the device in response to a debris signal. However, the patent to Bohman discloses a non-contact sensing unit for row crop harvester guidance system comprising debris/dust sensors (34, 36) (col. 7 lines 4-19) for detecting the energy beams 40 and 42 in the presence of dust and dirt in the region of the sensors and receptors to control the direction of movement of the device in response to the debris/dust signals. See figures 1 and 2. Kawakami et al disclose at column 3 lines 13-21 that the mode setting unit 34 selects the operation travel and cleaning mode in accordance with the results of sensor unit 37, and issues instructions to driving controller 32 and cleaning controller 33. Kawakami et al further disclose at column 3 lines 47 to 57 that the cleaning mode is changeable for severely soiled areas and lightly soiled, such that the time required to clean the entire area can be reduced by allowing careful and precise cleaning for heavily soiled areas and rapidly advancing over areas only light soiled. Kawakami et al also disclose at column 4 lines 16-17 that a map of the reflectivities according to position on the floor surface is stored in memory 92. Accordingly, Kawakami et al disclose that the mode setting unit determines a pattern (map) of movement based on the severely soiled area and the lightly soiled area to control the movement of the cleaner according to the "map" position stored in memory 92. Since Kawakami et al disclose that the mode setting unit selects the operation travel and cleaning mode in accordance with the results of sensor unit 37, and issues instruction to driving controller 32 and cleaning controller 33, it would have been obvious to one of ordinary skill in the art to provide Kawakami et al with the dust/debris sensors as taught or suggested by Bohman to control the steering and direction of movement of the cleaner device according to the map or pattern position stored in memory 92.

With respect to claims 4, 10, 11, 35, 40-42, 57, and 58, Bohman shows in figures 1, 2, 4, and 6 the debris/dust sensors comprise spaced-apart first and second debris/dust sensing elements respectively operable to generate first and second debris signals to steer the crop harvester guidance system. Since Bohman discloses the debris/dust sensors for controlling the direction of the harvester guidance which is similar to Kawakami et al's debris/dust cleaner controlled by the sensor unit 37, it would have been obvious to one of ordinary skill in the art to provide Kawakami et al with the first and the second debris/dust sensors as taught or suggested by

Bohman for controlling the direction of movement of the cleaner according to the map or pattern as stored in the memory 92.

5. Claims 5, 12, 26-31, 36, 43, 50, and 59-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al (5,613,261) in view of Bohman (4,918,441) taken with Crotzer (5,910,700).

Claims 5, 12, 26-31, 36, 43, 50, and 59-62 further recite that the debris sensor comprises a piezoelectric sensor element located proximate to a cleaning pathway of the cleaning apparatus and responsive to a debris strike to generate a signal indicative of such strike. However, the patent to Crotzer discloses dust sensor apparatus fabricated from a polymer material (flexible plastic or polymer material) or piezoelectric crystalline material such as polyvinyl compounds (see column 3 lines 13-36). Since Crotzer discloses at the background of the invention that mechanical, electrical, and optical sensors are used as dust sensors. Crotzer further discloses at the background of the invention that piezoelectric sensor can be used in place of the mechanical, electrical , and optical sensor. Therefore, it would have been obvious to provide Kawakami et al with the piezoelectric dust/debris sensor as taught or suggested by Crotzer for the benefit of the piezoelectric sensor as disclosed at the background of the invention.

6. Claims 17-25 and 48-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra et al (5,542,146) in view of Crotzer (5,910,700) or Japanese Patent 6-38912.

With respect to claims 17, 18, 48, and 49, the patent to Hoekstra et al discloses an electronic vacuum cleaner control system comprising a control and display as shown in figure 2, debris/dust sensor 90, dust detection circuit 88, and a control unit 72 for detecting the dust density to control the power of the vacuum cleaner when operating automatically. Whereas, the claims recite a piezoelectric element located proximate to a cleaning pathway of the cleaning apparatus. However, the patent to Crotzer (5,910,700) discloses dust sensor apparatus for sensing the dust presence from the dampening effect . The Japanese Patent 6-38912 discloses piezoelectric sensor 4 for sensing the dust density of a cleaning pathway as shown in figure 2. Since Hoekstra et al disclose optical dust/debris sensors and Crotzer teaches or suggests the benefit of piezoelectric dust/debris sensor over mechanical, electrical, and optical dust/debris sensor, it would have been obvious to one of ordinary skill in the art to provide Hoekstra et al

with the piezoelectric dust/debris sensor as taught or suggested by Crotzer or the Japanese Patent for controlling the power of the cleaner with response to the dust/debris sensor signal.

With respect to claims 20-25 and 51-56, Hoekstra et al show in figure 10 the processor integrated circuit comprising the amplifier 128, amplifier 132, and amplifier 134 for generating a second signal representative of a quantitative characteristic of debris being collected by the cleaning apparatus for controlling the power setting of the cleaner device. Figures 2 and 4 show the indicator lights.

Response to Arguments

7. Applicant's arguments with respect to claims 3-5, 9-12, 17-31, 34-43, and 48-62 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that Kawakami contains no teaching of "patterns of movement" and certainly no suggestion of the idea of "selecting a pattern of movement" from "at least one pattern of movement". Applicant's argument is not persuasive. Applicant's attention is directed to Kawakami et al figures 3-8, column 3 lines 13-21, column 3 lines 47-57, and column 4 lines 16-17. Kawakami et al disclose a mode setting unit, a map, and memory 92 for determining the "selecting a pattern of movement" as recited in the claims.

Applicant is reminded that the I-Robot demonstration shown on Oct. 29, 2004 demonstrated the I-Robot was not really moving at least one pattern of movement. The I-Robot was moving randomly on the floor with respect to the dust or debris sensed by the sensor of the I-Robot. Accordingly, Kawakami et al's reference shows in figure 7 the dust or debris sensing to control the cleaner performing the same "selecting a pattern of movement" as the invention. The claims are not patentable distinct from Kawakami et al.

Applicant further argues that Kawakami et al contains no teaching or suggestion of a "debris signal indicating that the cleaning apparatus has collected debris". Applicant's attention is directed to the debris sensor of the invention. The debris sensor senses the debris concentration on the floor. Applicant should realize that the debris signal does not indicating the cleaning apparatus has collected debris. When the debris concentration is lighter, that means the cleaning apparatus has collected debris. It is different from the debris signal **indicating** that the cleaning apparatus has collected debris. Applicant's attention is directed to Kawakami et al. Kawakami et al show in figure 7 the comparing step 708 and the cleaning effect step 709 to

determine the debris signal indicating that the cleaning apparatus has collected debris as recited in the claims.

Applicant argues that Kawakami does not speak of debris strikes, nor no teaching of calculating a debris gradient as discussed in the present application for patent. Kawakami discloses at column 4 lines 7-11. Kawakami discloses that reference number 93 refers to a comparison unit which compares the floor surface reflectivity of a clean floor stored previously in memory 92 with a floor surface reflectivity measured by the sensor unit, and calculates the **degree** of dirt based on the difference in the aforesaid reflectivities. A careful consideration is made that there is no patentable distinction between the "gradient" and the "degree" of debris or dirt. Therefore, Kawakami does teach and suggest the debris/dirt "gradient" or "degree".

Applicant argues that Crotzer discloses a dust sensing apparatus bearing no teaching or suggestion of its use in a robotic vacuum cleaner. Applicant's argument is not supported by the rejected claims. The rejected claims such as claim 17 do not support the robotic vacuum cleaner of the applicant's argument. Applicant also argues that it is unclear whether this device would be suitable for use in a high-vibration environment such as a vacuum cleaning device. Applicant's argument bears no patentability supporting value. Crotzer discloses in the patent a "DUST SENSOR APPARATUS" for sensing and controlling an apparatus. Crotzer discloses at the background of the invention U.S. Pat. No. 5,136,750 a vacuum cleaner using an optical sensor for sensing the dust or debris. Crotzer provides support for his piezoelectric dust sensor for using in the high-vibration environment such as a vacuum cleaning device of the invention U.S. Pat. No. 5,136,750 as recited at the background of the invention.

Applicant argues that Japanese 6-38912 appears to be no teaching or suggestion of changing operative modes in response to a debris signal indicative of debris strikes. Applicant's attention is directed to the rejected claims. The rejected claims such as claim 17 fail to support applicant's argument. Japanese 6-38912 teaches and suggests sensing the debris concentration to determine different mode of operation such as the power of the vacuum motor with respect to the piezoelectric debris sensor signal strength. Japanese 6-38912 teaches and suggests the use of piezoelectric debris sensor in a robot cleaner 3 to control the different power mode of the vacuum cleaner.

Citation of Pertinent References

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The patents to Coker (5,410,479) and Dickson et al (6,278,918 or 6,490,539 or 6,385,515 or 6,285,930) disclose guidance systems comprising dust sensors for sensing the crop row to control the steering of the vehicle for collecting the crop.

The patent to Gorsek discloses a grain sensor using a piezoelectric element for sensing the grains.

The patents and publications to Kobayashi et al (5,284,522 or 5,109,566), Nakanishi et al (5,959,423), and Taylor et al (2004/0244138 or 2004/0236468 or 2004/0211444 or 2004/0204792) disclose robot vacuum cleaners comprising moving patterns.

Communication Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Ip whose telephone number is (571)-272-1941. The examiner can normally be reached on Monday to Friday from 6:30 a.m. to 3:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin, can be reached on (571)-272-2107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Paul Ip
Primary Examiner
Art Unit 2837